

DEFINITIONS AND SPECIAL INSTRUCTIONS

1. Scope of survey

This survey covers manufacturers of refractories.

2. Figures to be reported

Companies with more than one establishment manufacturing the products covered by this survey are requested to complete a separate report form for each location. If you have not received a separate form for each of your establishments, please call the contact listed on the back of the report form or write to the U.S. Census Bureau for additional forms.

Quantity of shipments — Report products shipped to customers or transferred to other manufacturing plants of your company during the year. Report shipments of products made in the reporting plant only. Do not include shipments of products manufactured in other plants of your company or products made by other manufacturers which were purchased by you for resale in the same condition.

Report all items in metric tons. Report brick and shapes in both metric tons and thousand 9-inch equivalents. (A 9-inch equivalent is a solid volume of 101.25 cubic inches; a metric ton equals 1.102 short tons.)

Value of Shipments — Report the net selling value of the total quantity shipped of each product. The reported figures should represent the net-selling price, f.o.b. plant, after discounts, allowances, and returns. Exclude freight charges and excise taxes. If freight charges are prepaid by you, deduct these charges from the values reported. Report value in thousands of dollars.

3. Definitions

SHIPMENTS OF REFRACTORIES AND REFRACTORY MATERIALS, BY TYPE

CLAY REFRACTORIES

Item code 3208 — High alumina brick and shapes and pouring pit refractories, fireclay and high alumina containing 50% alumina and over, including glass-house pots, tank blocks, feeder parts, and upper structure shapes, made predominantly of calcined bauxite, kyanite, andalusite and similar raw materials. "Calcined" as applied to bauxite implies heat treatment short of fusion for volume stability prior to use in a refractory product. In the process, volatile materials are driven off and chemical changes take place.

Exclude mullite and extra high alumina refractories and molten cast. Report these products as nonclay refractories in item code 4139.

Item code 3203 — Fireclay and bloating fireclay ladle brick. Include alumina ladle brick which contain less than 50% Al_2O_3 . Report high alumina ladle brick which contain 50% Al_2O_3 and over in item code 3208.

Item code 3224 — Insulating fire brick and shapes. The subdivision of this code should be made in accordance with the ASTM Classification C-I 55, the respective groups being 16, 20, 23, 26, 28, and higher.

Item code 3241 — Refractory bonding mortars, wet and dry types. Include both airsetting and heatsetting bonding mortars which contain Al_2O_3 , dry basis, by analysis.

Item code 3245 — Plastic refractories and ramming mixes. Include products referred to as plastic fire brick and the less plastic materials intended for ramming into place after the addition of water (when shipped in dry form). Exclude plastic refractories and ramming mixes of mullite or extra high alumina. Report products made of these materials in code 4164.

Item code 3251 — Clay castable refractories (hydraulic setting), made from calcined fireclay, diaspore or bauxite base, and portland or calcium aluminate cements.

— High alumina castable refractories (hydraulic setting) 50% and over Al_2O_3 , made predominantly of bauxite, kyanite, andalusite, and similar raw materials.

Item code 3259 — Fireclay gunning mixes, including less than 50% Al_2O_3 . Include aluminosilicate compositions less than 50% Al_2O_3 specifically engineered for gunning applications; may include hydraulic setting or other chemical bonding agents. Insulating gunning mixes (hydraulic setting). Density up to 105 pounds per cubic foot, less than 50% Al_2O_3 .

NONCLAY REFRACTORIES

Note: Molten cast refractories are made by fusing refractory oxides, as in an electric furnace, and pouring the molten material into molds to form finished shapes.

Item code 4139 — Extra-high alumina brick and shapes made predominantly of fused bauxite, fused or dense-sintered alumina. Exclude molten cast extra high

3. Definitions — Continued

alumina brick and shapes. Report products made by this method in code 4144. Fused as applied to bauxite and alumina, means complete melting, as in an electric furnace. After cooling, the product is crushed and graded for use in the refractory. Dense-centered alumina refers to heat treatment (short of melting) to render it relatively volume-stable for use in a refractory.

— Extra-high alumina pouring pit refractories including sleeves, nozzles, runners, tuyeres, and ladle gate parts, made predominantly of fused and synthetic aluminas.

Exclude molten cast, report in code 4144.

Item code 4156 — Extra-high alumina mortars, made predominantly of fused or synthetic aluminas and mullites.

Item code 4169 — Other nonclay plastic refractories and ramming mixes (forsterite, zircon, etc.) All plastics and ramming mixes not reported in codes 4158, 4164, and 4166.

Item code 4164 — Extra-high alumina castables (hydraulic setting), made predominantly of fused or synthetic aluminas and mullite.

Item code 4172 — Other nonclay refractory castables (hydraulic setting). Include hydraulic-setting castables made from nonclay refractory materials and portland or calcium cements. Report clay castables in code 3251. Report extra high alumina hydraulic setting castables in code 4164.

Item code 4180 — Basic nonclay gunning mixes. Include chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite gunning mixes. Extra high alumina castables which can be gunned should be reported in code 4164.

Item code 4191 — All nonclay refractory material sold in lump or ground form and used directly by consumer as a finished refractory, and exported material. Includes calcined clay, ground brick and siliceous and other gunning mixes.

Item code 4195 — All other domestic shipments of nonclay refractory materials sold in ground or lump form as a refractory raw material and for reprocessing in the manufacture of brick and other refractories. Do not include magnesite or dolomite.

Item codes 8513 and 8515 — Dead-burned magnesia or magnesite. Include in code 8513 domestic shipments of materials for direct use as finished refractory products, and all exports. Exclude from code 8513 all domestic shipments or transfers to plants of your company or to other companies for reprocessing in the manufacture of brick or other refractories. Report these domestic shipments in code 8515.

4. Comparability

Data reported in this survey should correspond to data reported in the Economic Census - Manufacturing Sector form. The sum of values for item codes shown in column (a) should correspond to dollar values reported under product codes indicated in column (b) below:

Current Industrial Reports (Form MA327C)	Economic Census - Manufacturing Sector
Item codes (a)	Product codes (b)
3203–3283	3271240 100
4101–4195	3271250 100

REFERENCE LIST

FORM MA327C		
REFRACTORIES		
Product code	Item code	Item description
		CLAY REFRACTORIES
		Brick and shapes
3271240111	3203	Fireclay, including semi-silica, bloating and superduty fireclay brick and shapes, fireclay and high alumina pouring pit refractories; clay kiln furniture; radiant heater elements; and other miscellaneous clay refractory shapes
3271240211	3208	High alumina brick and shapes containing 50% alumina and over, including glass-house pots, tank blocks, feeder parts, and upper structure shapes, made predominantly of calcined bauxite, kyanite, andalusite, and similar raw materials. [Exclude mullite and extra high alumina refractories and molden cast. Include high alumina pouring pit refractories (containing 50% alumina and over), sleeves, nozzles, runners, and ladle gate parts]
3271240411	3224	Insulating brick and shapes
		Unshaped clay refractories
3271240421	3241	Refractory bonding mortars, wet and dry, including clay and high alumina
3271240431	3245	Plastic refractories and ramming mixes, less than 50% alumina; high alumina plastic refractories and ramming mixes, 50% alumina and over; and high alumina phosphate bonded plastic refractories and ramming mixes, 50% alumina and over
		Castable refractories (hydraulic setting)
3271240311	3251	Castable refractories less than 50% alumina; high alumina castables 50% alumina and over; and insulating castables (hydraulic setting), density up to 105 lbs/cubic foot
		Gunning mixes
3271240441	3259	Fireclay gunning mixes, including hydraulic setting gunning mixes less than 50% alumina; high alumina gunning mixes, 50% alumina and over; and insulating gunning mixes (hydraulic-setting)
		Other refractory raw materials and refractory materials sold in lump or ground form, either for direct use by customer as a finished refractory product or as exported material
3271240451	3273	Clay and high alumina refractory raw materials
3271240461	3283	Clay and high alumina refractory materials
3271240100	3200	TOTAL VALUE OF CLAY REFRACTORIES (Sum of items 3203–3283)
		NONCLAY REFRACTORIES
		Brick and shapes
3271250111	4101	All silica brick and shapes, excluding semisilica [Report semi-silica under fireclay brick and shapes]
3271250121	4104	Magnesite-carbon brick and shapes, both less than 7% carbon, 7% carbon and over, predominantly pitch and resin bonded, and carbon magnesite brick
3271250131	4111	Magnesite brick and shapes, burned and unburned. [Do not include carbon impregnated magnesite brick and shapes]
3271250141	4116	Magnesite-chrome, chrome-magnesite, including high fires, burned and unburned brick, and chrome brick
3271250151	4128	Silicon-carbide brick and shapes made predominantly of silicon carbide, including kiln furniture
3271250161	4139	Extra-high alumina brick and shapes containing 87 1/2% alumina and higher, and extra-high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, ladle gate parts and mullite brick and shapes. [To be made predominantly of synthetic or fused mullites. Exclude molten cast; report in product code 3271250181, all others]

REFERENCE LIST — Continued

FORM **MA327C**

Product code	Item code	Item description
		NONCLAY REFRACTORIES — Continued
3271250171	4141	Zircon brick and shapes made predominantly of either of these materials, including electrocast
3271250181	4144	All other brick and shapes, including dolomite, dolomite-magnesite, forsterite, pyrophyllite-zircon, carbon and graphite crucibles, retorts, stopper heads, natural graphite, refractories, and molten cast
		Mortars
3271250211	4154	Unshaped nonclay refractories basic bonding mortars made predominantly of magnesite or chrome ore, dolomite and other nonclay mortars, made predominantly of forsterite, zircon, and silica
3271250216	4156	Extra high alumina refractory mortars made predominantly of fused or synthetic alumina and mullite
		Plastic refractories and ramming mixes
3271250221	4158	Basic castable mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite
3271250226	4164	Extra high alumina plastic refractories and ramming mixes, 87 1/2% alumina and higher made predominantly of fused or synthetic aluminas and mullites, and extra-high alumina phosphate bonded plastic refractories and ramming mixes
3271250241	4166	Extra high alumina castables and gunning mixes
3271250236	4169	Other nonclay plastic refractories and ramming mixes (forsterite, zircon, etc.)
3271250231	4172	Other nonclay refractory castables and plastic refractories
		Gunning Mixes
3271250246	4180	Basic nonclay gunning mixes including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite and other nonclay gunning mixes (forsterite, zircon, etc.)
3271250251	4184	Ceramic refractory fibers, 1500 ° F and higher
		Other nonclay refractory materials sold in lump or ground form, including ground silica [not reportable above. (Report dead-burned magnesia or magnesite in product codes 3279920331 and 3279920336.)]
3271250256	4191	Domestic shipments for direct use by customers as a finished refractory and all exported material
3271250261	4195	All other domestic shipments of nonclay refractory materials sold in lump or ground form as refractory raw materials [Do not include magnesite.]
3271250100	4100	TOTAL VALUE OF NONCLAY REFRACTORIES (Sum of items 4101–4195)
		DEAD-BURNED MAGNESIA OR MAGNESITE
3279920331	8513	Domestic shipments for direct use as finished refractory products and all exported material
3279920336	8515	All other domestic shipments predominantly for use as a refractory raw material
3274100311	8523	DEAD-BURNED DOLOMITE

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